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Prevalence of Coronary Variants and Anomalies Detected on Computed Tomography Angiogram (CTA) Cardiac Among Patients

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Objectives:

To estimate the prevalence of coronary variants and anomalies detected on CTA cardiac patients.
To determine demographics characteristics of the study respondents based on age, sex and coronary dominance.

To determine any association between coronary variants and anomalies with:
(i) total calcium score
(ii) stress test results
(iii) other concurrent congenital heart disease
iv) significant / insignificant coronary artery occlusion
(v) underlying myocardial infarction.

Methods

- 83 CTA cardiac studies were included and analysed in this retrospective study.
- These data were retrieved from hospital's archiving computer system (PACS) database.
- All of these CTA cardiac examinations were performed by using Siemens MDCT Scanner 64 slices.
- The identification of coronary variants and anomalies were performed by one trainee radiologist and subsequently verified by a cardiac radiologist.
- The data was analyzed by using Fisher's Exact Test with significant value taken as $p < 0.05$.

Results

Detection of coronary variants and anomalies - 25.3%.

- Ramus intermedius (RI) - 20.4%
- Myocardial bridging of LAD (MB) - 3.6%
- Left circumflex arising from right aortic cusp -1.2%.

The patients who had CTA cardiac done were:

- within the range of 41 to 60 years old (54.2 %)

- majority were male patients (67.5%)

Mostly are of right coronary dominance (86.7%).

No significant association found between coronary variants and anomalies with;
(i) total calcium score (p = 0.220),
(ii) stress test results (p = 0.085),
(iii) other concurrent congenital heart disease (n = 0)
iv) significant / insignificant coronary artery occlusion (p = 0.295)
(v) underlying myocardial infarction (n = 0).

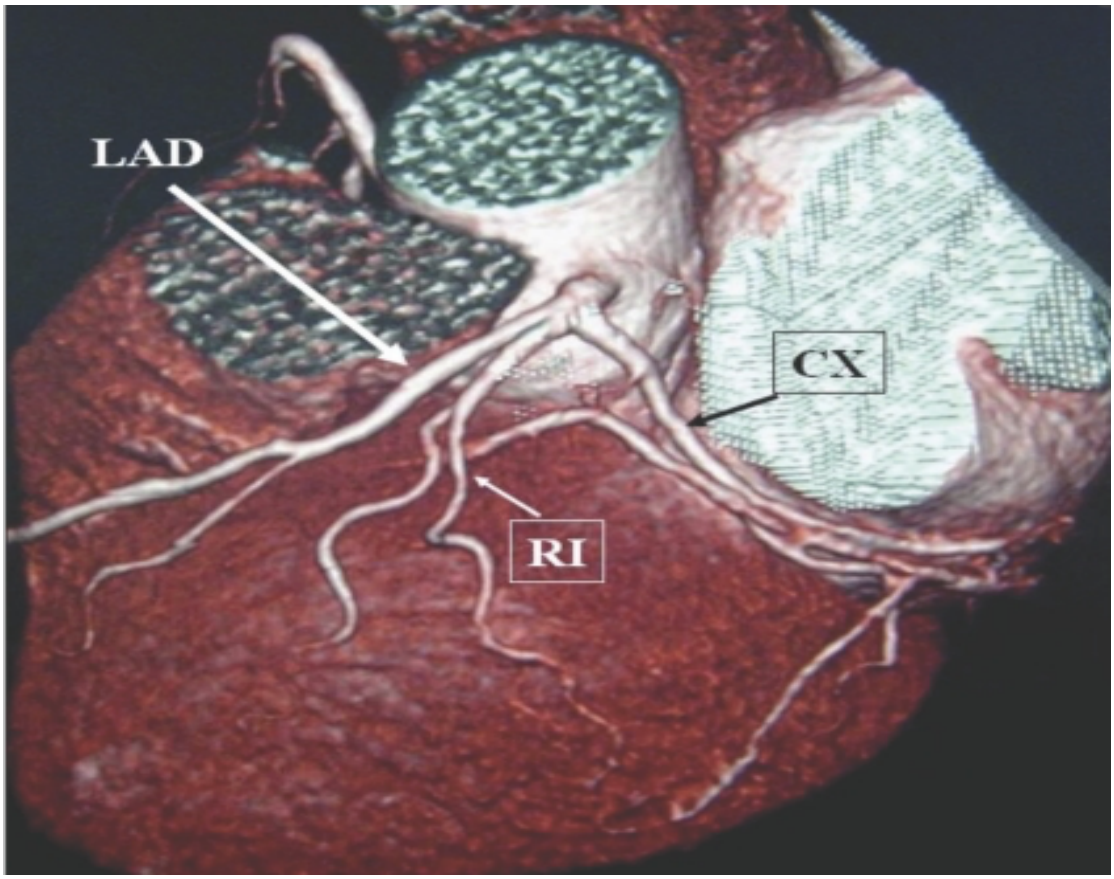

Figure 1: Incidental findings of Ramus Intermedius (RI) in a 58-year-old man.Volume rendering technique (VRT) image showing left main coronary artery (LM) with trifurcation into left anterior descending (LAD) as shown in thick white arrow, Circumflex artery (Cx) as shown in thin black arrow, and Ramus Intermedius (RI) s shown in thin white arrow.

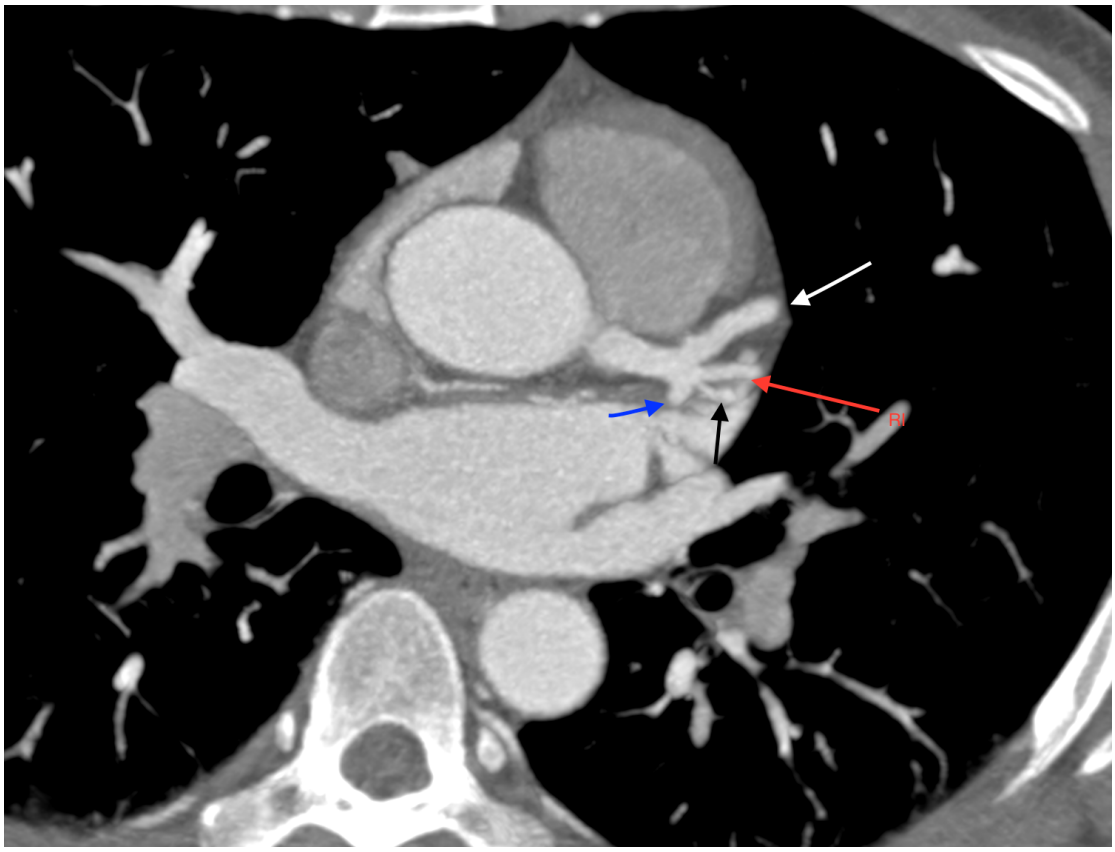

Figure 2: Axial CTA cardiac in a 65 years old man, showing trifurcation of LM coronary artery Ramus Intermedius (red arrow), Proximal Left circumflex artery (blue arrow) and Proximal Left anterior descending artery (white arrow).

Also seen here is early take off obtuse marginal 1 artery (black arrow)

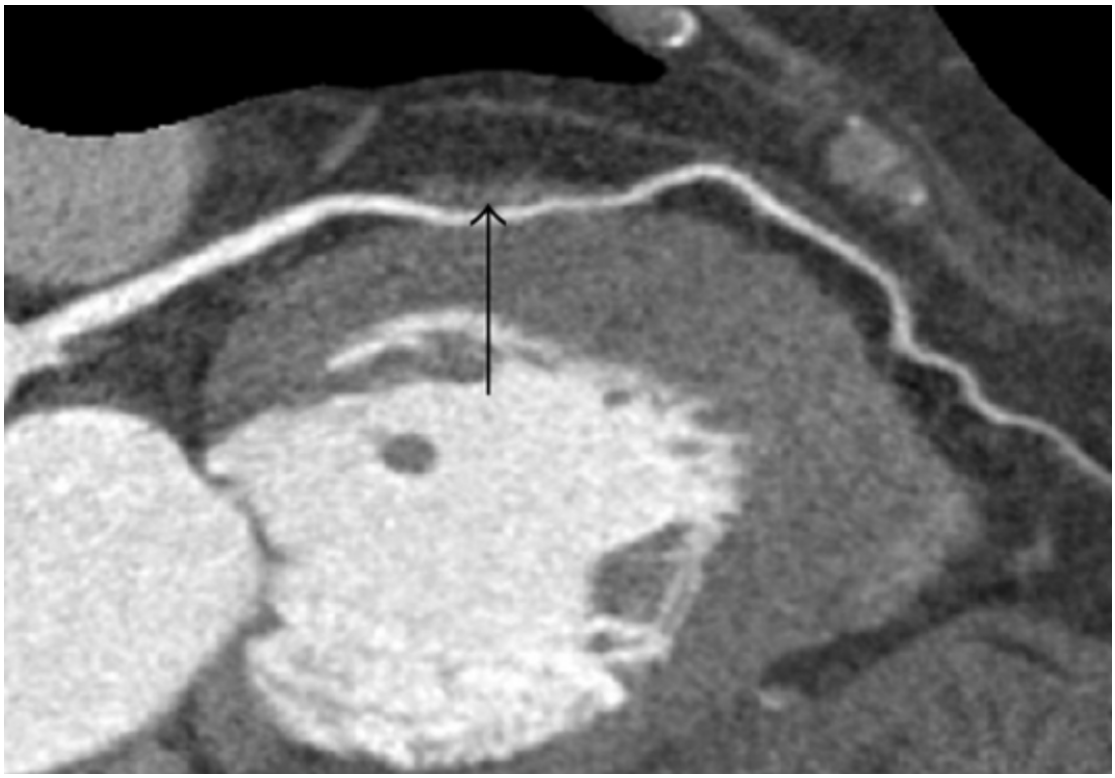

Figure 3: Maximal Intensity Projection image (MIP) showing myocardial bridging of left anterior descending artery (LAD) which traverses superficially within the myometrium (black arrow).

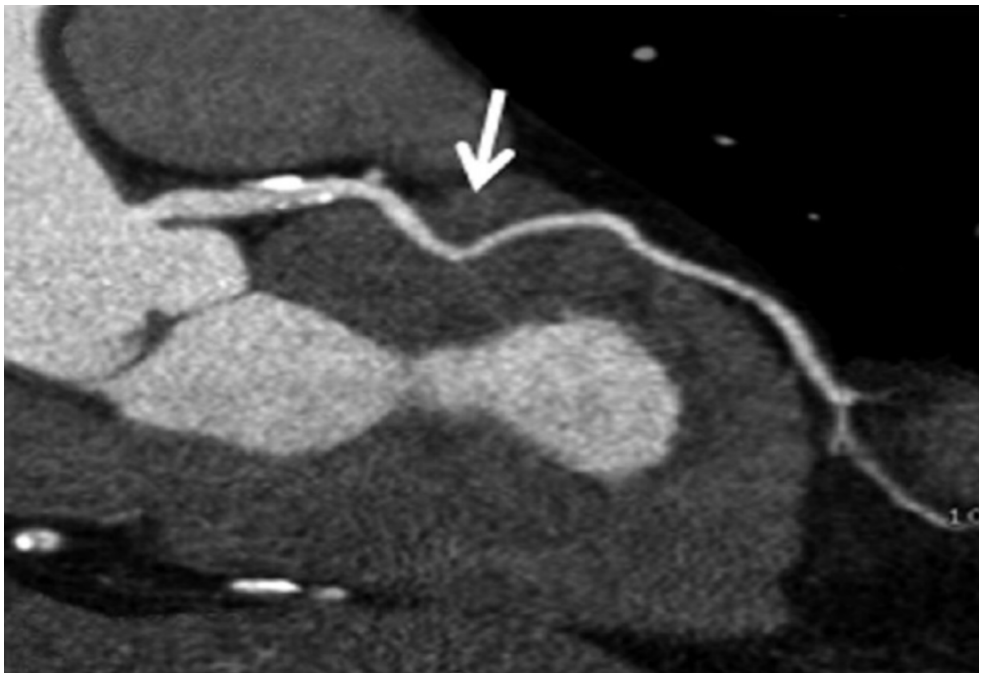

Figure 4: Maximal Intensity Projection image (MIP) showing myocardial bridging of left anterior descending (LAD) which traverses more in depth within the myometrium (white arrow).

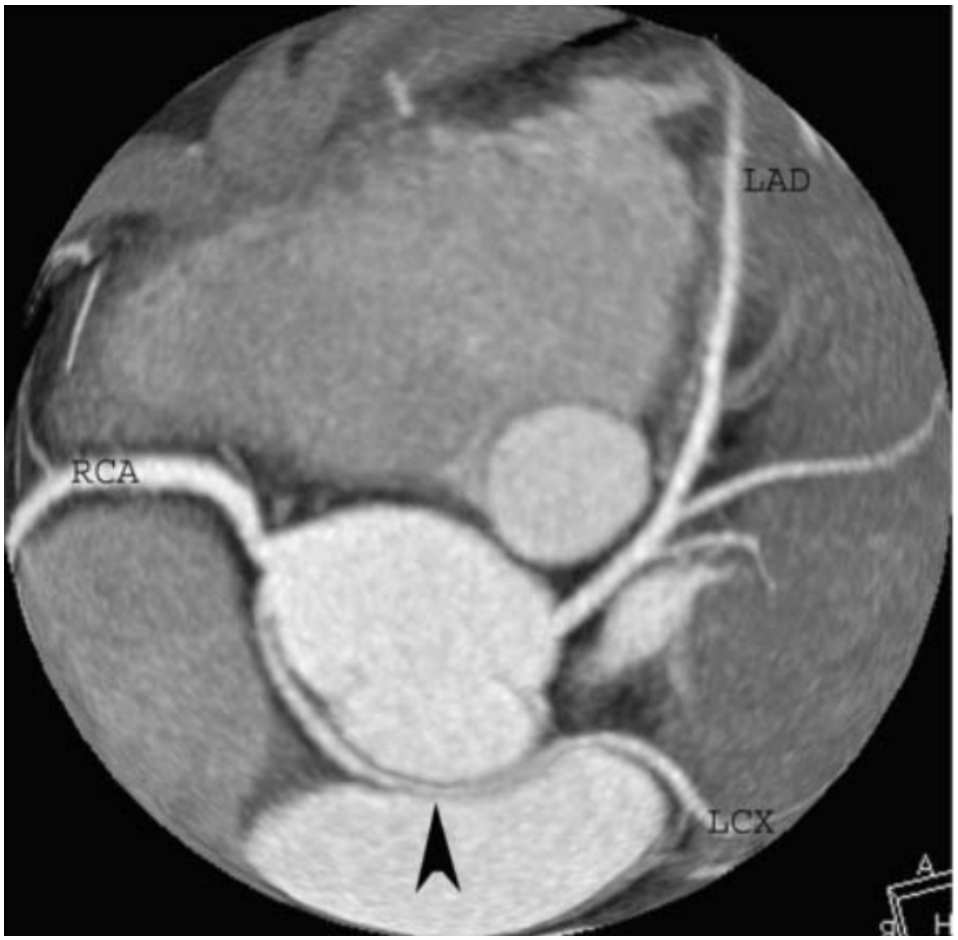

Figure 5: Anomalous course of the left circumflex artery (black arrow head) between the aortic root (star) and left atrium (blue arrow). Also visualised are right coronary artery (RCA) and left anterior descending artery (LAD).

CONCLUSION

The detection of coronary variants and anomalies was 25.3%, which is higher than previous reported study. This acquired data of prevalence of coronary variants and anomalies is the first ever data documented in Pakistan.

We recommend that CTA cardiac probably can be used as screening tools, a baseline study, during pre-surgery or pre-interventional work up. CTA cardiac has been the most reliable tool for identification of coronary variants and anomaly in opposed to conventional catheter angiogram.

CT examination has several advantages over conventional angiogram because it is non-invasive with visualisation of both vessels, lumen and simultaneous visualisation of all coronary arteries and all cardiac chambers. It is also superior to conventional angiogram in delineating the origin and proximal course of anomalous coronary arteries as well as in patients with myocardial bridging who presented with chest pain or even myocardial infarction.

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